TDARS News Letter

G3ZME G6ZME

TELFORD AND DISTRICT AMATEUR RADIO SOCIETY

www.TDARS.org.uk FOUNDED 1969 www.TelfordHamfest.co.uk

Issue 256 Mar/April 2013

Programme

www.TDARS.org.uk www.telfordhamfest.co.uk

March 20	Lenses—the How and Why with Bob M0RJS
March 27	ANNUAL GENERAL MEETING—Agenda Pg.3
April 3	Committee Meeting (note:7:30pm) & GX3ZME on-the-air HF / VHF
April 10	Table Top Sale. Sell all your unwanted bits and kit .
April 17	The 'new' bands—472KHz and 5 MHz: What it's all about
April 19-21	GB100TMD at Tywyn (Satnav LL36 9HN) for Intl. Marconi Day (Saturday)
April 24	1st. 2 metre walking DF Hunt. Starts at 7:30pm LWVH car park
May 1	Committee Meeting (note:7:30pm) & GX3ZME on-the-air HF / VHF
May 8	Martin's (2E0TRO) refurbished US military ambulance (and maybe more)
May 15	Indoor Bowls Social Evening (LWVH)
May 22	2nd. 2 metre walking DF Hunt. Starts at 7:30pm LWVH car park
May 25 (Sat. pm)	Visit to Vintage Wireless Museum of Ben Nock G4BXD, Kidderminster
May 29	B-B-Q , LWVH Field. Meals by TICKET, to avoid disappointment this time.
June 5	Committee Meeting & GX3ZME on-the-air HF / VHF
June 12	VHF NFD and 50 MHz Trophy Contest Preparation

For Amateur Radio Exam Training—enquiries to Mike G3JKX (01952 299677)
For Morse Training and Morse Proficiency Tests Martyn G3UKV or Eric M0KZB.
For Equipment Loans & Returns contact Ricky M0RKY or Simon 2E0CHV

Radio Amateur Exams- Latest: www.tdars.org.uk/html/trainingFoundation.html

Editorial

It's been a time of mixed events in local family fortunes. On the negative side, a keen past member died; Fred Campbell 2E0ANU of Meadow Close,Trench, passed away on the 7th February 2013. He was an enthusiastic member of the Society, and one of Mike's (G3JKX) earliest Foundation Licence candidates. Ill health restricted his Amateur Radio activities and TDARS attendance at weekly club meetings, but he was a keen listener in past years. Unhappily also, Peter G3MWQ,a past TDARS member, suffered a stroke in November, which has quite severely affected his ability in everyday activities, including operating his AR station. Peter has improved over recent weeks, and he is receiving much family and medical support, such as speech therapy. We all wish Pete a steady recovery.

On the positive side, Richy (M0RKY) and Sarah (M6TZE) now have a huge source of QRM, which they brought to the club with them at a recent meeting (see photo). Sarah has already made some management decisions, and she is in charge of inputs (food, drink etc), whilst Richy attends to the inevitable outcomes of such inputs, particularly when it comes to poo-ey nappy-change time which happened during the club meeting early in March. The new op. is Ash-Lee, and he's on the Foundation wanabe waiting list. Congratulations and 73 all round.

MIV

Photo: M0KZB

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IMPORTANT NOTICE

Following the purchase of a new printer (Samsung CLP 680nd) for this Newsletter, I have proposed to the Society committee that in future, members will need to "OPT IN" if they wish to receive a PAPER PRINTED version of this bi-monthly publication. A number of members have suggested that they do not require a printed version, since they download it from the TDARS website. It's worth pointing out that this has several advantages: it saves members' money in printing/posting costs, they can 'zoom in' to enlarge text and especially photographs as well as print out images etc selectively. Finally it reduces waste in terms of paper and printing toner, and will extend the life-time of the printer. The committee support this development. Jim (who posts the Newsletter where required) and I will collect a list of those wishing to 'OPT IN' to receive a printed version over the next few weeks. Please let either of us know your choice ASAP. Subscription rates will not be affected whichever choice you make. **MIV—Editor**

TELFORD & DISTRICT AMATEUR RADIO SOCIETY

CHAIRMAN: Derek Southey G0EYX (01785 604904)

VICE-CHAIRMAN: Martyn Vincent (01952 255416)
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PUBLICITY : Dave G0CER (01630 638699 or 07971 416940, leave msg)
Committee: Richard G0VXG; Simon G0UFE; Eric M0KZB; Martin 2E0TRO; Rob M0TOY; Trophies/Certs: G3UKV QSL Manager David M0PNN; Assist. Curator: Simon 2E0CHV (01588 673053)

Qtc: News & Information

TDARS MEETINGS EVERY WEDNESDAY AT LITTLE WENLOCK VILLAGE HALL UNLESS INDICATED OTHERWISE ON THE FRONT PAGE PROGRAMME.
ROOM BOOKED FROM 7PM - 10PM.
MEETINGS USUALLY COMMENCE AT 8PM
Please return borrowed equipment promptly

International Marconi Day (IMD)
20 April 2013
GB100TMD TYWYN Cardigan Bay
—here we come!

Station 'MUV' Est:1913
ALL WELCOME
Site Sat-nav code
LL 36 9HN
by
Marconi Cottages

TELFORD & DISTRICT ANNUAL GENERAL MEETING 27th MARCH 2013 : AGENDA

1) Apologies
2) Chairman's opening remarks & report
3) Minutes of TDARS AGM 28 March 2012
4) Matters Arising
5) Treasurer's Report & Matters Arising
6) Election of 2013-14 Committee
7) Presentation of Trophies

Any relevant items for inclusion in the Agenda must be received by the Hon. Sec (Mike, G3JKX) at least 7 days prior to the AGM.
Annual Subs are due at this time—please note the **current** rates are £28, or £22 non-earners, £14 full time students. The committee recommend that these should remain the SAME for 2013/14.

The ***Under-a-Fiver construction competition*** took place in February. There were 8 entries—less than usual. In third place was Martyn G3UKV with his 472 KHz VFO, second was Richard G0VXG with his 'spot welder' based around a microwave oven transformer and hefty 3-turn secondary winding with prods that could pass something like 300 amps (a live demo was MOST entertaining!) and in the top spot was Norman G0ASP with his morse key touch paddles and oscillator that were really well presented.

As well as the Tywyn visit in April for the Int. Marconi Day event (**GB100TMD**) shown above, John M0JZH, Simon 2E0CHV and Speedy 2E0KLS are organising a portable special station each month this year. The latest outing using ***GX6ZME/P*** was from the Roman Wroxeter site near Shrewsbury. Other possible sites planned for 2013 include Stokesay

Castle (May 18), Ironbridge/Enginuity: Museums on the Air (June 22-23), Wenlock Olympic Games (July 13/14), Railways on the Air - Horsehay? SVR ? (Sept. 21/22). Scout Jamboree-on—the –Air (Oct. 19/20: Wellington, Wolverhampton). Locations for August, November and December are not yet decided, but they would welcome suggestions and offers of assistance. The website **qrz.com** gives useful information—check out GX6ZME, and of course the TDARS website.

Make a note in your diairies for **Saturday May 25**, when Ben Nock G4BXD is letting us visit his *incredible* ***Military Wireless Museum in Kidderminster***. Ben has one of the best vintage collection of radios in the UK, so it is a rare opportunity to see all these military sets dating back to the 1940s and earlier, mostly in fully-restored original condition.
His new QTH has made it possible to display the vast majority of the sets he has collected from all continents of the world, but space is still somewhat limited. Therefore we will divide into smaller groups (say, 8 per group) and take turns to see the exhibits that Saturday afternoon. Obviously we shall need to take names beforehand to organise the groups sensibly.

On **Saturday 22 June**, the Ironbridge Gorge Museum is organising "***Blitz Hill***" - as a special evening to reflect the 'Home Front' of ***war-time Britain in the 1940s***. The venue is Blist's Hill (Madeley), and TDARS have been invited to provide some appropriate activities and exhibits in a metal 'shed' (shack ?) on the site. A number of ideas are being floated about, ("...Germany calling, Germany calling …") and those involved (not too many !) will be wearing suitable period costumes.

Another likely visit - assuming there are sufficient number of members wishing to go on it— is a ***visit to Bletchley Park*** (nr Milton Keynes) on **Saturday 5th October**. We have been talking about such a visit for some time, especially since the RSGB National Radio Centre opened there early last year. This particular date has been chosen since the B.P. staff are organising a feature called "Are You Listening ?", which their website claims will 'celebrate communication through B.P.'s history'. Car-sharing should help to keep travel costs down.

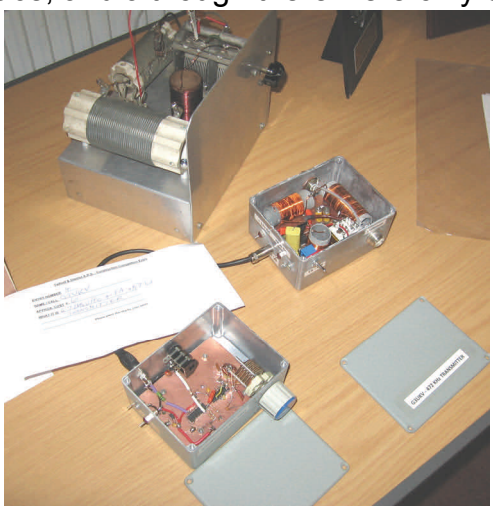
Yet more ***Special Event Station*** operation has been organised for **Wednesday 16th October and also the weekend of 26/27 October.** This is part of the RSGB's Centenary Celebrations for 2013, and all radio clubs in each UK Region of the RSGB have been invited to use the special station for specific days. The Midlands, our region, has been allocated from Oct. 8th to Nov.4th, so we have booked the above days to put on the station **G100RSGB**. The location(s) for this SES have not been finalised, since we require a good site for HF, VHF and UHF, as it links in with the RSGB's Centenary Operating Awards for both HF and VHF, and we should be in great demand for QSOs on all bands 160m to 70cms, and all modes. Some TDARS members are having a go to achieve the 'standard' or 'gold' operating award, and it's not too late to start now! See 'RSGB centenary 2013' on website **www.rsgb.org** for details.

The ***2 metre 'walking' DF hunts*** start late in April (24th.) and take place in (or near) Little Wenlock. Frequency 144.600 MHz FM, with the first transmission taking place at 7:30pm. The hounds (searchers) congregate in our HQ car park, and occasionally deliberately mis-direct fellow hounds. ("... I think I saw him in the Huntsman car park…"). Remember the club now has 3 (or was it 4 ?) spare 2m DF antennas for members to borrow, complete with offset oscillator units attached, which allow you to tune 4 MHz offset (ie 140.600 or 148.600 MHz) when you get really close (~250 yds) from the 'fox'. Experience from last year shows that you need to have both the direct (144.6) and 'offset' frequencies easily accessible—possibly using two memories on your handheld for quick selection. Always start the search using the prime frequency—else you will probably hear nothing ! The offset unit does a superb job in de-sensing (attenuating) the receiver, thus avoiding overload, right down to the last few yards.

Jim G8UGL, reminds members that any ***change of address, e-mail or callsign*** needs to be sent to him—preferably in writing- so that he can update his database. This information is essential for membership records. Jim reminds members that Membership Cards should be updated each year—see also note below. We also now need to know if you wish to receive a PRINTED version of the Newsletter—see Notice on page 2.
Jim's e-mail is **jim@g8ugl.wanadoo.co.uk**

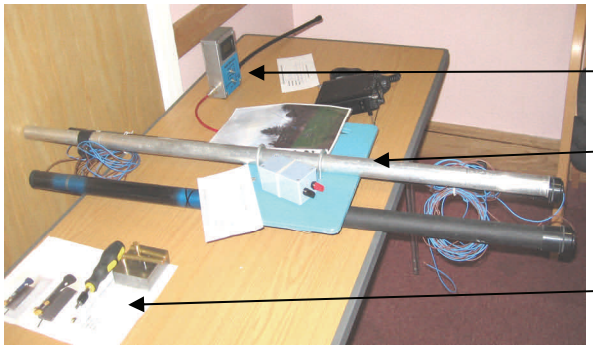
The Committee have asked that members should ***present their Membership Card when borrowing equipment.*** This makes it easy for Richy (or Simon) to know who is (or is not!) a TDARS club member. After all, the committee carries some responsibility for ensuring that all Society equipment is accounted for, and that it is only loaned to bona fide club members. If your membership card is always carried with you, or in your vehicle, there should be no problem.

The ***Main Construction competition*** has just taken place, and although there were only 8 entries, it was a most entertaining evening, with the usual humour and banter in plentiful supply. It's a shame that only a few members entered anything they had made over the past year, and in particular no one could claim to be a 'novice' constructor, so that trophy will remain locked in the cupboard until 2014 ! There was a mixture of kits and original designs. In 4th place was Norman's (G0ASP) completed morse paddles and oscillator, 2nd equal were Simon (G0UFE) with his compact portable delta loop and Richard (G0VXG) with his retro crystal set, which included an original xtal-set coil, plus beautifully home made box, knurled connectors etc. Finally, and much to his surprise, Martyn (G3UKV) won the top spot with his completed 30 watt VFO + PA 472 KHz transmitter + ATU. (pictured).



Another recent competition was the annual ***Little Wenlock quiz night***, where TDARS entered a small, but knowledgeable, team in the shape of Kevin (G8UPF) and Peter (M1FGN). Kevin writes: "We were in the lead throughout the quiz against 13 other teams, and we had a final score of 77—tying with another team; we lost on a silly tie-break question—How many steps are there in the Eiffel Tower? Our guess 2900, the other team 2300. The given answer was 1792." (I thought everyone knew that—Editor). Anyway, Kevin had a good consolation prize of a bottle of wine as the best 'individual' entrant. Well done to both Kevin and Peter, and thanks for making the effort to represent TDARS. We should try to field a full team (of 4) in 2014.

Very few members seem to be supporting the ***UKAC Tuesday evening VHF/UHF/SHF*** contests locally this year, although about 3 members soldier on, and we are placed 17th out of 76 clubs overall (as of 15 March). There is an unfortunate tendency this year for people not directly associated with a specific club, like Telford, to simply add their scores to an existing, perhaps very successful group. This makes the Club rankings rather meaningless. Last year the Bolton club swept the board on all bands, and as far as I know, all operators lived in the general Bolton area. They came the well-deserved top club in 2012.This year, things are different....



Some construction entries:

M0PNN SWR/PWR bridge

G0UFE Delta loop

G0ASP Emtech ATU

M0TOY keyer (parts)

The Genesis G3020 Transceiver Kit—by Paul M0PNN

[Editor's note: Paul wrote a full article on his construction and development of this two band SDR transceiver for the FISTS (morse) magazine. I have reduced it somewhat, since it has been published elsewhere. I've focused on Paul's thoughts, problems and reflections as the project developed, as well as showing where to get help (Internet + Rob) I'm sure Paul will happily send anyone the full version if requested.]

"I have built a few simple kits in the past, but nothing as complex as the G3020. My level of technical expertise is limited. I am a groundsman by trade so I could at a push explain the difference between an FET gate and a garden gate.
Computers and radios should be kept as far apart as possible. Anyone who like me connected a ZX Spectrum to their radio in the nineteen eighties will know what I mean. Every cable was wrapped up in a ferrite rod to reduce the inference. Once the QRM was reduced the rewards were amazing. I can remember watching TASS, amateur RTTY, weather fax stations and decoding CW and SSTV. Thankfully things have made some progress. Computer QRM should be much less today.
After reading about SDR and playing with online SDR radios, I really wanted to try one out at home, but commercial SDR transceivers are expensive and what if I did not like it? Eventually I came acros GenesisRadio in Australia selling SDR transceiver kits designed by YU1LM. I chose the G3020 because it had two of my favourite bands—20 and 30 Metres. Cost £125 including postage.

Construction

Two weeks after ordering, the kit arrived. After unpacking I bagged up the components into stages as set out in the web site.

Stage 1

The power stage a simple 7805 and few resisters and caps with a green led - so far so good.

Stage 2

The oscillator section added the four crystals, resistors, transistors, caps, 74HC04S, wire links and tested. Good strong signal was heard at 40.50 all test voltages ok.

Stage 3

Band Switch section four double pole double throw switches mounted on a waste piece of copper clad board wired so a diode is lit when the switch is thrown. Selects which local oscillator is used. All was OK.

Stage 4

Dividers stage added the 74AC74PC, chokes, caps and resistors. This stage divides the local oscillators output into four quadrature signals. After completion of this stage you can test the output of the oscillators with a standard HF receiver by tuning to the local oscillator divided frequency e.g. 40.05/4= 10.125. All worked ok, but 10.125 would only start if the radio was turned on with it selected. Flipping a switch to select another local oscillator then back to 10.125 caused 10.125 not to start. Changing the 22pf cap to a 27pf made a dramatic difference the oscillator started nine times out of ten.

Stage 5

Rx mixer and opamps stage added diodes and resistors, npo and usm capacitors, relays, op amps ,74HC4066 ,BNC connector, pcb 3.5mm plugs. Set up board by temporarily shorting out pins to enable I and Q channels for sound card. Tack soldered the bnc connector to the mixer stage input.
This is one of the most exciting stages of the build - hearing signals for the first time. For testing I installed and setup Winrad connected a battery and antenna. It worked very well receiving ssb cw etc.
This is where the problems started for me. I could not get any reduction in RX image. In theory forty DB should be possible between signals in I and Q channels. My PC at the time was an AMD 3000 64bit with 1GB Ram about five years old and the sound card was a cheap sound blaster x-fi using the internal sound card was no different. After checking and rechecking components I decided to continue with the build as a major PC upgrade was on the cards and the problem was possibly my old PC setup.

Stage 6

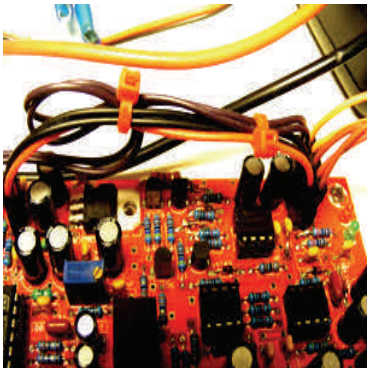
Low pass filters and preamp stage. No problems here. I added 2n3866 wound a couple of T50-6 toroids added the axel inductors, caps, resisters, relays and a couple of permanent wires on underside of the board. I tested the attenuator and preamp both working ok.

Stage 7

CW monitor. Added LM741 resistors, caps etc. Tested and it worked. Not the best sounding side tone, but it does the job.

Stage 8

PA RX/ TX control is a major stage. I added DB9 connector, trim pot, a couple of temporary wires, caps, resisters, etc all working fine the radio switches in and out of transmit.

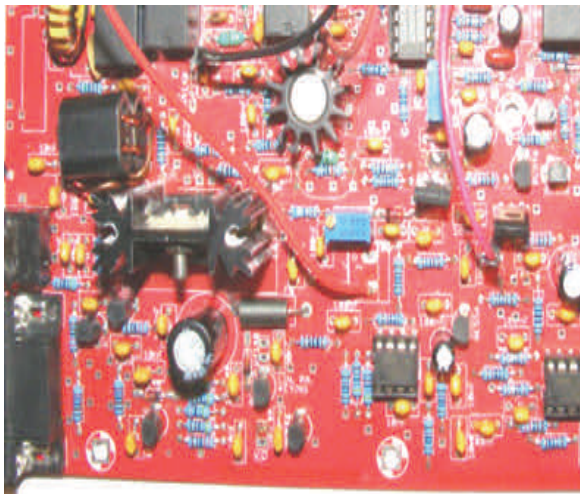


Stage 9

Tx sample and hold. This stage takes the I and Q signals from the computers sound card and produces the quadrature outputs to the bilateral mixing switches.

Stage 10

Tx Driver and Pa. Glued together and wound two binocular cores then added fet, heat sink, and link wires.



<u>It does not work</u>?

After carrying out all the tests, it was clear something was wrong with the transceiver. I could not get any reduction in RX image. Nor was there any output from the tx stage. The com-port switched the radio into tx mode the red led lit, but no RF out.

The wire I had used for link wires and the band switches, pre-amp, attenuator was poor quality and had come off in a couple places and blown a couple of transistors. The first thing I did was replace the link wires with wire from an old computer psu. I replaced the four band switches with a rotary switch and used header pins with connectors on the board for switches for pre-amp, attenuator, cw monitor and zip tied them together where I could.

I replaced a broken inductor in the filter section which doubled the rx level and a BD 139 transistor which turned the preamp on/off. Once I left the board plugged in and went for a bath when I came back and found the wife shopping at ADSA online and accidently put the board in TX mode. Pop went my IRF510.

I checked the board many for times for errors and could find nothing wrong with it. M0TOY Rob offered to look at the board when he had time, so I boxed it up and gave it to him to have a look at in his own good time.

Rob found a blown transistor which switched the RX off when TX is engaged. He set up the RX and TX images and gave the board back to me.

<u>SDR</u>

The trouble with SDR radios is the number of things that can go wrong has increased if the computer hardware is not up to the job you are in trouble before you start. My sound card was a cut down version of the sound blaster x-fi. No matter how it was configured there was no stereo separation.

My PC died at this point which gave me the opportunity to build a new one more to my liking. I chose an Intel duel core with 8GB of ram 2GB GFX card solid state hard drive for OS and 2TB of storage. The internal sound on my new motherboard is so much better than my old pc and the built in sound card has proper inputs and stereo separation that works. After receiving the board back from Rob I installed the software Genesis GSDR configured it and managed my first cw qso on 11/7/11 with IK2TKX using 2 watts he gave me a 579.

Still my problems were not over. About 8 watts output on 30m but only 2 watts on twenty metres which reduced the further up the band I went. Remembering other people having similar problems on the genesis forum the problem was solved by removing a couple of turns from the low pass filter inductors.

<u>Cooling</u>

For many months I used the board with an old cpu cooler bolted to the top of the heat sink that came with the board. While this kept the IRF510 cool, it was very loud.

When fitting the transceiver in an air tight box some means of ventilation must be provided. Rob K5TD had used a quiet fan, but had to cut 5mm from the bottom of the head sink to fit it in. I decided to use a slimmer quiet fan and attach it to the lid of the enclosure. To increase the surface area of the heat sink I cut some thin strips of tin from a powered baby milk container and soldered them together and bolted to the top of the heat sink.

A 15mm thick fan was attached to the lid of the enclosure above the heat sink and slots cut in the side panels to let cool air in. Is it better to suck the warm air off the heat sink or blow cooler air over its surface? After experimenting with wspr mode I found the least drift + or – 1 or 2 Hz each tx cycle by sucking the warm air off the heat sink. The transceiver will run at full power over two minute WSPR cycles and not even get warm.

SDR Software

The trouble with SDR radios is the number of things that can go wrong has increased. For example connecting the Transceiver to a USB to RS232 converter when using Windows Seven 64 bit. Sound card setup and drivers setting up virtual audio cables for digital modes getting the input levels right. Is it worth it? The power of SDR is in the software being able to see 48khz to 192khz bandwidth and use all the functions and modes of a high cost transceiver. Like user adjustable filters with very little ringing. Multiple notch filters. Adjustable noise blanker, memory keyers, split operation, digital modes ssb etc. Seeing the look on the faces of some TDARS club members when showing cw skimmer decoding 200 plus CW QSOs from a Russian CW contest when demonstrating for the main construction contest was priceless!!

Conclusion

I very much enjoyed the construction of this kit and learned a great deal about SDR. Some very valuable lessons were learned. Use good quality wire for the link wires and don`t be afraid to customize if it makes a better job. Ask questions if you get stuck. I`ve worked 50 plus countries with a straight key and had great fun.

The Genesis G3020 SDR Transceiver Kit is no longer available but Genesis SDR kits are still available here http://www.genesisradio.com.au/ .

Thanks to Rob MOTOY for his help and advice.

The finished Genesis 3020 !

Cheers Paul
M0PNN

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